Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(3): 3542-3544
Received: 09-03-2018
Accepted: 10-04-2018

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Identification of aromatic short grain rice varieties based on potassium hydroxide test

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Abstract
The present investigation was carried out at laboratory in the Department of Seed Science and Technology OUAT Bhubaneswar. To identify aromatic short grain rice varieties by using potassium hydroxide test. The leachates of the seeds react with alkali to produce colour with different intensity which could be used in characterization of rice cultivars. KOH test is useful in identification of red kernel rice genotypes. In the present study, among thirty aromatic short grain rice varieties all aromatic short grain varieties reacted positively to potassium hydroxide test. Based on potassium hydroxide test, the aromatic short grain rice varieties were classified in to five groups as yellow (V1/V3, V4, V6, V7, V8, V9, V11, V12, V13, V14, V15, V16, V17, V18, V20, V23, V24, V25, V26, V27, V28 & V29) light yellow (V21), light brown (V19), brown (V2 & V30) and wine red (V5, V10 and V22). Thus based on the colour reaction of palea and lemma of seeds to potassium hydroxide test can be effectively distinguished.

Keywords: Potassium hydroxide test, aromatic rice short grain rice varieties, colour reaction, identification

Introduction
Rice (*Oryza sativa* L.) is the staple food crop in the world particularly in India (Subbaiah *et al*., 2011) [5] occupying a total of 23.3% of gross cropped area. Rice contributes 43% of total food grain production and 46% of total cereal production in India. Among the rice growing countries in the world, India has the largest area under rice (about 45 m.ha.) and ranks second in production next to China (Kaul *et al*., 2006) [3].

Aromatic rice varieties constitute a small but special group of rice and have gained greater importance with the worldwide increase in the demand for fine quality rice (Sun *et al*., 2008) [6]. These are preferred around the world since ages because of the excellent aroma and palatability. Aromatic rice has occupied a prime position in the Indian society. There are many known groups of aromatic varieties such as basmati rice from India and Pakistan and Jasmine rice from Thailand. Usually in India, basmati rice is grown in north western states like Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir and parts of Uttar Pradesh. Basmati types enjoy a unique place for three distinct quality features like pleasant aroma, extra-long superfine grain and extreme grain elongation and soft texture of cooked rice. Accordingly, small and medium grained aromatic rice are being regarded as a separate class of non-Basmati aromatic rice. Although no concrete documentation exists, native areas of cultivation for most of these rice are known, are referred to as indigenous scented rice.

The Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPV & FR Act, 2001) recognizes the farmers as breeders who bred new varieties as well as conserved the traditional varieties. The plant varieties must fulfil the distinctiveness, uniformity, stability (DUS) criteria for protection under the Act and hence, there is a need to characterize the aromatic short grain rice varieties according to DUS test guidelines for rice prescribed by PPV and FR Authority (2007). The variety identification serves the important goals such as mitigating legal claims ad confirming intellectual property rights and maintenance of genetic purity. Plant morphological characters have been recognised as the universally undisputed descriptors for DUS testing and varietal characterization of crop varieties.

The present trend of continuous release of rice varieties from Central and State Varietal Release Committee has warranted to develop suitable techniques for varietal identification at the laboratory level particularly when the seeds have been submitted for seed purity analysis. Maintenance of genetic purity of varieties is of primary importance for preventing varietal deterioration during successive regeneration cycles and for ensuring varietal performance at an expected level. The chemical tests reveal differences among the seeds and seedlings of different varieties.

These tests require virtually no technical expertise or training and can be completed in a relatively short time. The results of these tests are usually distinct, easily interpreted and help in grouping of the genotypes.

Materials and Methods

Seeds of aromatic short grain rice varieties were soaked in four per cent KOH solution for 3 hours and thereafter change in the colour of the solution was noted. Based on the intensity of colour reaction, aromatic short grain rice varieties were classified into five groups viz.,

Light Yellow
Yellow
Light brown
Brown
Wine red

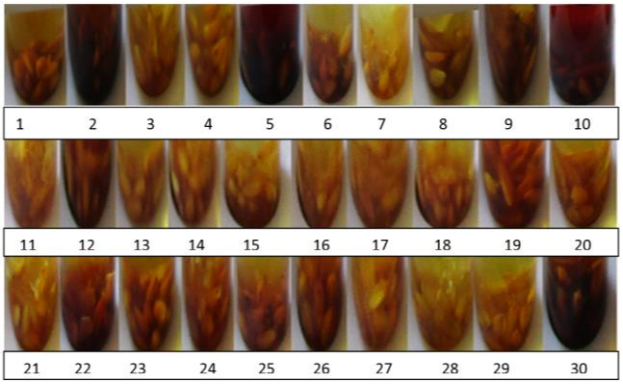
Results

Although a set of morphological descriptors of seed are used for broad classification of aromatic short grain rice varieties are less distinct making morphological evaluation much more difficult for identification. In view of this biochemical tests are being used concurrently to reveal chemical differences among the seeds of aromatic short grain rice varieties. They require virtually no technical expertise or skill and can be completed in a relatively short time. Since the results of these tests are usually distinct and easily interpreted, an attempt was made to characterize and identify the aromatic short grain rice varieties. The leachates of the seeds react with alkali to produce colour with different intensity which could be used in characterization of rice cultivars. KOH test is useful in identification of red kernel rice genotypes.

Potassium hydroxide test (KOH)

SL.NO.	Aromatic short grain rice varieties	Colour reaction of lemma and palea
1	Nua Acharmati	Yellow
2	Nua kalajeera	Brown
3	Nua Dhusura	Yellow
4	Nuachinikamini	Yellow
5	Barikunja	Wine red
6	Basumati	Yellow
7	Badshabhog	Yellow
8	Bishnubhog	Yellow
9	Chatianaki	Yellow
10	Deulabhog	Wine red
11	Dhanaprasad	Yellow
12	Dubraj	Yellow
13	Dulhabhog	Yellow
14	Dangerbasamati	Yellow
15	Ganagabali	Yellow
16	Gopal bhog	Yellow
17	Heerakani	Yellow
18	Kanak champa	Yellow
19	Karpurabasa	Light brown
20	Kusumabhog	Yellow
21	Mugajai	Light yellow
22	Nalidhan	Wine red
23	Neelabati	Yellow
24	Nanu	Yellow
25	Pimpudibasa	Yellow
26	Ratnasundari	Yellow
27	Sirimula	Yellow
28	Tulasi phoola-1	Yellow
29	Thakurasuna	Yellow
30	Thakurabhoga	Brown

The leachates of the seeds react with alkali to produce colour with different intensity which could be used in characterization of rice cultivars. KOH test is useful in identification of red kernel rice genotypes. In the present study, among thirty aromatic short grain rice varieties all aromatic short grain varieties reacted positively to potassium hydroxide test. Based on potassium hydroxide test, the aromatic short grain rice varieties were classified in to five groups as yellow (V1, V3, V4, V6, V7, V8, V9, V11, V12, V13, V14, V15, V16, V17, V18, V20, V23, V24, V25, V26, V27, V28 & V29) light yellow (V21), light brown (V19), brown (V2 & V30) and wine red (V5,V10 and V22). Thus based on the colour reaction of palea and lemma of seeds to potassium hydroxide test can be effectively distinguished. Which was further, confirmed by Anithalakshmi (2002) [1], Anithalakshmi *et al.* (2014) [2], Mor *et al*. (2006) [4], Vijayalakshmi and Vijay (2009) [7] revealed that colour reaction test of potassium hydroxide test was useful in effective identification of rice genotypes.



Colour reaction of aromatic short grain rice varieties to potassium hydroxide test

Acknowledgement

The authors acknowledge the WOS-A, Department of Science and Technology, Govt. of India for funding this project.

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